

## WHAT IS CLAIMED IS:

1. An FPD fabricating apparatus comprising:

a process chamber in which a process is performed;

a substrate support plate provided in the process chamber, wherein a  
5 to-be-processed substrate is mounted on the substrate support plate;

a transfer chamber through which the substrate is entered into the  
process chamber from an exterior or through which the substrate is ejected  
from the process chamber to the exterior;

a first carrier plate and a second carrier plate on which the substrate  
10 is mounted, wherein each of the first and second carrier plate has a forked  
shape of which ends are directed from the transfer chamber to the process  
chamber;

a robot provided in the transfer chamber, wherein the robot  
comprises an arm of which end is directed from the transfer chamber to the  
15 process chamber, and wherein the arm has a reciprocating motion between  
the transfer chamber and the process chamber, thereby the robot transferring  
the first and second carrier plates;

carrier plate lift pins provided in the transfer chamber and the  
process chamber, wherein the carrier plate lift pins are raised up and fallen  
20 down while avoiding contact with forked prongs of the robot arm, so that  
the first and second carrier plates mounted on the robot arm can be raised up  
and fallen down; and

substrate lift pins provided in the transfer chamber and the process  
chamber, wherein the substrate lift pins are raised up and fallen down while  
25 avoiding forked prongs of the robot arm, the first carrier plate, and the

second carrier plate, so that the substrates mounted on the carrier plates can be raised up and fallen down.

2. The FPD fabricating apparatus according to claim 1, wherein the robot arm has a reciprocating translational motion without having a rotational motion.

3. The FPD fabricating apparatus according to claim 1, wherein the substrate lift pins are disposed in order to uniformly support the entire substrate.

4. An FPD fabricating apparatus comprising:

a process chamber in which a process is performed;

a substrate support plate provided in the process chamber, wherein a to-be-processed substrate is mounted on the substrate support plate;

a transfer chamber through which the substrate is entered into the process chamber from an exterior or through which the substrate is ejected from the process chamber to the exterior;

a robot provided in the transfer chamber, wherein the robot comprises a double blade member having an upper blade and a lower blade on which the substrate is mounted, wherein the double blade member has a reciprocating motion between the process chamber and the transfer chamber, and wherein each of the upper and lower blades has a forked shape of which end is directed from the transfer chamber to the process chamber;

inner lift pins provided in the transfer chamber and the process

chamber, wherein the outer lift pins are disposed below the substrate which is mounted on the double blade member, and wherein the inner lift pins are raised up and fallen down while avoiding contact with the forked prongs of the double blade; and

5           outer lift pins provided in the transfer chamber and the process chamber, wherein the outer lift pins are disposed at outside locations just below the substrate which is mounted on the double blade member, wherein the end portions of the outer lift pins are angled at a horizontal direction, and wherein the outer lift pins are rotated on their own vertical shafts.

10           5.       The FPD fabricating apparatus according to claim 4, wherein the double blade member has a reciprocating translational motion without having a rotational motion.

15           6.       The FPD fabricating apparatus according to claim 4, wherein the inner lift pins are disposed in order to uniformly support the entire substrate.

7.       An FPD fabricating apparatus comprising:

          a process chamber in which a process is performed;

20           a substrate support plate provided in the process chamber, wherein a to-be-processed substrate is mounted on the substrate support plate;

          a transfer chamber through which the substrate is entered into the process chamber from an exterior or through which the substrate is ejected from the process chamber to the exterior;

25           a robot provided in the transfer chamber, wherein the robot

comprises an arm, wherein the substrate is supported by the arm, and wherein the arm has a reciprocating motion between the process chamber and the transfer chamber;

lower lift bars provided in the process chamber, wherein the lower lift pins are disposed at outside locations just below the substrate which is mounted on the arm, and wherein the end portions of the lower lift bars are angled at a horizontal direction;

upper lift bars provided in the process chamber, wherein the upper lift pins are disposed at outside locations just below the substrate which is mounted on the arm, wherein the end portions of the upper lift bars are angled at a horizontal direction, and wherein the upper lift bars are arranged to be raised up to higher locations than the lower lift bars are;

inner lift pins provided in the process chamber, wherein the inner lift pins are disposed below the substrate which is mounted on the arm, the inner lift pins are raised up and fallen down while avoiding contact with the arm; and

stand-by lift bars provided in the transfer chamber, wherein the stand-by lift pins are disposed at outside locations just below the substrate which is mounted on the arm, and wherein the end portions of the stand-by lift bars are angled at a horizontal direction.

8. The FPD fabricating apparatus according to claim 7, wherein the arm has a reciprocating translational motion forwards and backward.

9. The FPD fabricating apparatus according to claim 7, wherein the

arm is extended in a direction from the transfer chamber to the process chamber to support a central portion of the substrate.

10. The FPD fabricating apparatus according to claim 7, wherein the angled end portions of the upper lift bars, the lower lift bars, and the standby lift bars are stretched near to the central portion of the substrate.

11. An FPD fabricating apparatus comprising:

a process chamber in which a process is performed;

a transfer chamber being a passage through which the substrate is entered into the process chamber from an exterior or through which the substrate is ejected from the process chamber to the exterior;

a transfer slider member provided in the transfer chamber, wherein a transfer slider member has a reciprocating translational motion between the process chamber and the transfer chamber to transfer a substrate; and

a plurality of lift pins provided in the process chamber and the transfer chamber, wherein the substrate is raised up and fallen down by the plurality of lift pins.

12. The FPD fabricating apparatus according to claim 11, wherein the transfer slider member is a two-stage slider member comprising a pair of a lower slider and an upper slider.

13. The FPD fabricating apparatus according to claim 12, wherein each of the upper slider and the lower slider comprises:

a reference panel

liner guides provided on the reference panel;

a carrier having a reciprocating translational motion along the liner guides;

5 a ball screw provided in parallel to the liner guides for allowing the carrier to have the reciprocating translational motion; and

a drive motor for driving a rotation of the ball screw,

wherein the reference panel of the upper slider is mounted on the carrier of the lower slider; and

10 wherein the blade for supporting the substrate is mounted on the carrier of the upper slider.

14. The FPD fabricating apparatus according to claim 12, wherein each of the upper slider and the lower slider comprises:

15 a reference panel

liner guides provided on the reference panel;

a carrier having a reciprocating translational motion along the liner guides;

a iron-core coil provided below the carrier; and

20 a permanent magnet provided opposite to iron-core coil and in parallel to the liner guides,

wherein the reference panel of the upper slider is mounted on the carrier of the lower slider, and

25 wherein the blade for supporting the substrate is mounted on the carrier of the upper slider.

15. An FPD fabricating apparatus comprising:

a process chamber in which a process is performed;

a substrate support plate provided in the process chamber, wherein a  
5 substrate is mounted on the substrate support plate;

a transfer chamber connected to the process chamber, wherein the  
transfer chamber is used as a passage through which the substrate is entered  
into the process chamber from an exterior and the substrate is ejected from  
the process chamber to the exterior;

10 a robot provided in the transfer chamber, wherein the substrate is  
transferred by the robot, and wherein the robot has a reciprocating motion  
between the process chamber and the transfer chamber;

a plurality of inner lift pins provided at locations out of the substrate  
support plate where the substrate is to be mounted, wherein the substrate is  
15 raised up and fallen down by the up-and-down motion of the inner lift pins;  
and

fold-type outer lift bars provided at outside locations out of the  
substrate support plate where the substrate is to be mounted, wherein each  
of the fold-type outer lift bars comprises a vertical shaft and a horizontal  
20 support member, wherein the vertical shaft is arranged to have a up-and-  
down motion, wherein the horizontal support member comprises an outer  
support bar perpendicularly connected to the vertical shaft with a first joint  
which is provided at an upper end of the vertical shaft and an inner support  
bar connected to the outer support bar with a second joint which is provided  
25 at an end of the outer support bar, and wherein the horizontal support

member is folded on the center of the second joint.

16. The FPD fabricating apparatus according to claim 15, wherein the fold-type outer lift bar is arranged to support a location which is closer to the central portion of the substrate than a location of the substrate which the inner lift pin supports when the inner lift pin is entirely unfold without interference.

17. The FPD fabricating apparatus according to claim 15, wherein the first and second joint are connected with a power transmission means, wherein the first joint is rotated by the rotation of the vertical shaft, and wherein the rotational energy of the first joint is transmitted to the second joint the power transmission means, thereby the rotations of the second joint is interlocked with that of the first joint.

18. The FPD fabricating apparatus according to claim 17, wherein the power transmission means is a belt.

19. The FPD fabricating apparatus according to claim 18, wherein the power transmission means is a steel belt.

20. The FPD fabricating apparatus according to claim 15, wherein the outer lift bar further comprises an auxiliary support bar, wherein the one end of the auxiliary support bar is rotated independently from the vertical shaft by a first auxiliary joint which is provided near the vertical shaft on



the inner wall of the process chamber, and wherein the other end of the auxiliary support bar is connected with the second auxiliary joint at an extending portion of the end of the inner support bar which is connected to the second joint.

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21. The FPD fabricating apparatus according to claim 20, wherein each of the ends of the auxiliary support bar is perpendicularly angled and has a predetermined length.

10 22. The FPD fabricating apparatus according to claim 15, wherein the vertical shaft of the outer support bar is provided with the inner-wall space of the process chamber.

15 23. The FPD fabricating apparatus according to claim 22, wherein lock gates are provided at the inner wall of the process chamber to protect the horizontal support member from a processing gas when the horizontal support member is folded and entered into an inner-wall space of the process chamber.

20 24. The FPD fabricating apparatus according to claim 15, wherein the robot is arranged to have a forward-and-backward motion in a sliding manner.

25 25. The FPD fabricating apparatus according to claim 15, wherein the robot comprises a joint at a predetermined portion thereof, where the robot

has a reciprocating motion between the process chamber and the transfer chamber without having a rotational motion.

26. The FPD fabricating apparatus according to claim 15, wherein the  
5 robot comprises two fingers.

27. The FPD fabricating apparatus according to claim 26, wherein each  
of the fingers has a plurality of substrate support wings which are branched  
at predetermined location of the finger, and wherein the length of the  
10 substrate support wings is set to be longest within a range where the  
substrate support wing can not interfere with the rotational motion of the  
outer lift bar.